

CLAIMS

What is claimed is:

1. An anti-viral agent comprising a ligand that targets RNase H RNA-DNA hybrid substrates of RT, wherein the ligand inhibits the RNase H activity of RT.
2. A method for inhibiting reverse transcriptase comprising the step of:

targeting RNA-DNA hybrid substrates of the RNase H activity of RT, wherein the anti-viral agent of claim 1 targets and binds to the RNA-DNA hybrid substrates, thereby inhibiting the RNase H activity of reverse transcriptase.
3. The method of claim 2, wherein the anti-viral agent is an aminoglycoside.
4. The method of claim 3, wherein the aminoglycoside is selected from a group consisting of neomycin, kanamycin, paromomycin, tobramycin and ribostamycin.
5. The method of claim 2, wherein the anti-viral agent is neomycin.
6. The method of claim 5, wherein the neomycin to RNA-DNA hybrid substrate ratio is 1:1.
7. The method of claim 6, wherein the neomycin inhibits reverse transcriptase induced cleavage of the substrate by 80% at the primary site.

8. The method of claim 5, wherein the neomycin to RNA-DNA hybrid substrate ratio is 5:1.

9. The method of claim 8, wherein the neomycin completely inhibits reverse transcriptase induced cleavage of the substrate at the primary site.

10. An anti-HIV-1 agent comprising an aminoglycoside that targets RNase H RNA-DNA hybrid substrates of reverse transcriptase, wherein the aminoglycoside prevents the reverse transcriptase from cleaving the HIV-1 RNA, thereby inhibiting replication of HIV-1.

11. A method for inhibiting HIV-1 reverse transcriptase comprising the step of:

targeting RNase H RNA-DNA hybrid substrate of RT, wherein the anti-HIV-1 agent of claim 10 targets and binds to the RNA-DNA hybrid substrate at the location of RNase H activity, thereby inhibiting viral replication of HIV-1.

12. The method of claim 11, wherein the anti-HIV-1 agent is an aminoglycoside selected from a group consisting of neomycin, kanamycin, paromomycin, tobramycin and ribostamycin.

13. A method for screening potential anti-viral agents that inhibit RT activity by targeting RNase RNA-DNA substrates of RT comprising the steps of:

- (a) mixing a potential anti-viral agent with a specific RNase RNA-DNA hybrid substrate,
- (b) adding RT to the mixture in step (a),

- (c) resolving the cleavage product of RT, and
- (d) analyzing the effect of the potential anti-viral agent on the RNase activity of RT.

14. A high throughput screening method for identifying anti-viral agents that inhibit the RNase activity of RT by targeting RNase RNA-DNA hybrid substrates comprising the steps of:

- (a) selecting a group of potential anti-viral agents,
- (b) introducing each potential anti-viral agents from the group to a reaction mixture containing labeled target RNase RNA-DNA hybrid substrate,
- (c) introducing RT to each mixture in step (b),
- (d) resolving the cleavage products of RT for each mixture in step (c), and
- (e) analyzing each potential anti-viral agent for its ability to inhibit the RNase activity of RT.

15. A kit for screening potential anti-viral agents that target RNase RNA-DNA hybrid substrates comprising:

- (a) a reaction mixture containing a labeled target RNase RNA-DNA hybrid substrate,
- (b) reverse transcriptase, and

(c) instructions for use.

16. The kit of claim 15, further comprising a mixture to stop the cleavage reaction of RT.

17. The kit of claim 16, further comprising a mixture for denaturing the RNA-DNA hybrid substrate.

18. The kit of claim 17, further comprising a mixture for denaturing the RNA-DNA hybrid substrate.